

Bettinger 10/065,998

Remarks

Information Disclosure Statement

Please reference attached form PTO/SB/08A.

35 USC P 102 Rejection

Marsh has the following distinctions.

Tank Shell

Boss and end caps

Cylindrical pipe (central conduit)

Examiner cites Marsh Figs 1-8 where the bosses are 12 and 14 and the strut is 16. This citation by the examiner references Marsh's "elongated cylindrical side wall or shell 16" (see column 3, lines 61-62) instead of Marsh's central conduit with is comparable to Bettinger's central conduit. Applicant stipulates that both the skin and the conduit are cylindrical but skin and conduit differ not only in size but in positional relationship and functional attributes. The skin is exterior, but the conduit is internal. The skin stops fluid flow, but the conduit distributes fluid flow. The skin only experiences tension. The central conduit experiences many loadings.

Marsh and Bettinger both have central conduits that are centered on and proximate to the tank longitudinal axis. The skin can not be central to the tank and occupy the exterior at the same time. Marsh and Bettinger both have a central conduit with holes for the flow of fluid. The skin does not have holes. Holes would damage the function of the skin. Further it is intuitively obvious to the most casual observer that the skin of a tank is not a strut, conduit, or pipe.

In a phone conversation between the examiner and the applicant on 10June04, the examiner justified the juxtaposition of skin and conduit by pointing out that size or relative dimensions of the cylindrical section was not grounds for overriding his rejection. However it is prima facie that this skin vs. axial conduit does not fall under *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. The word "only" is key. Other attributes distinguish the skin from the central conduit for Marsh and Bettinger.

Therefore examiner's attention is directed to Marsh's central conduit. The applicant appreciates Marsh as parallel configuration to Bettinger without parallel distinctions.

In the following two citations Marsh describes a central conduit that is disposed to direct fluid flow. In the first citation Marsh specifies that the central conduit is independent of the end structure of the pressure vessel since it length stops "slightly above the ... end cap." In the second citation the central conduit is described as fixed to a screen rather than the pressure vessel structure.

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Marsh Citation 1: Fig 7 and column 5 lines 61-64

A central conduit 64 extends from the valve 40 to slightly above the inner surface of the lower end cap in the middle of the juncture of the channels 44 formed by the vanes 42.

Marsh Citation 2: column 6 line 2-7

As shown in FIG. 7, the conduit 64 passes through the central aperture of the collector screen 52. Since the collector screen 52 is constructed of a resilient plastic, the flange 54 which extends about the central aperture thereof resiliently engages the outer surface of the cylindrical conduit 64 for maintaining the conduit in substantially fixed tight relationship with the central aperture of the collector screen 52.

Bettinger Claim 1

A composite tank stiffener comprising:

at least one generally cylindrical pipe and strut possessing at least one slip joint selected to provide (1) compressive dimensional limit by abutting slip joint surfaces and (2) telescoping moment restraint during axial relative positional movement by congruent wall slip joint surfaces, said generally cylindrical pipe and strut connecting the two internal faces of two composite boss for a filament wound tank.

Bettinger teaches the distinctions of:

Tank Shell

Boss and end caps

Cylindrical central pipe structure joining end structures of tank/boss

Slip joint

Inward compression on central pipe

No outward tension on central pipe

Moment resistance of the central pipe joint

Restraint device requires no manual adjustment

Response to 102 Rejection

The above citations show that Marsh in relation to this central conduit is concerned only with fluid flow and its containment and direction. For the teaching that Marsh has outlined, the structural strength of the central pipe is immaterial since the pressure is equal on all sides. Marsh specifies that the central conduit may be fiberglass but makes no teaching concerning structural capability or structural attributes of the central conduit. Examiner states that in Fig. 4 "the bosses are 12 and 14 and the strut is 16 and the pipes are connected to the bosses". Applicant respectfully points out that Marsh Fig. 4 shows the pressure vessel to boss connection not a central conduit to boss connection. The central conduit of Marsh can not limit an external movement since no components of the pressure vessel are connected by the central conduit. Marsh is not a joint connecting the end caps of the tank. Bettinger is not anticipated by Marsh to support a 102 rejection as a "limit on movement."

35 USC P 103 Rejection - Nishimura in view of Marsh

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Marsh- Slip Joint

Applicant agrees that Marsh has a central conduit. Marsh describes an O-ring connection but not for the central conduit. However Marsh does specify a fixed tight relationship for the central conduit as noted above in citation 2. Marsh has no connection or joint with the components of the pressure vessel. Therefore applicant must respectfully point out that Marsh is not a slip joint fitted central conduit as the examiner has suggested.

Nishimura: Nishimura has the distinctions of:

Tank with Boss

Cylindrical central pipe structure

Threaded joints for central pipe structure

Nishimura discloses the aspects of this central structure in the Summary of the Invention in the next two citations which is a fixed threaded central structure moveable in moderation and fixing the distance between the end structures.

Nishimura Citation 1: Column 2, lines 33-43

According to an aspect of the present invention, the two end wall sections are rigid end wall members disposed at a fixed distance from each other by means of the connecting member thereby forming an end wall assembly. An elastic peripheral wall sheet is so fixed to the two end wall sections so as to enclose a space between the end wall members. Hereinafter, a liner is designated by the end wall assembly and the peripheral wall sheet. Finally, a reinforcing layer is provided around the liner.

Nishimura Citation 2: Column 3, lines 53-55

In this aspect, both sleeves may be connected by means of the connecting member so as to be either at a fixed distance from each other or movable in moderation.

Nishimura discloses the specifics of this central structure in the Figures and the description of the drawings as quoted in the next three citations which is a fixed threaded central structure moveable in moderation.

Nishimura Citation 3: In Fig. 1 and column 5, lines 1 - 4.

Both the internal thread holes 12, 13 communicate with each other.

Nishimura Citation 4: In Fig. 6 and column 6, lines 27-34.

In the third embodiment of FIG. 6, the connecting member 6, is formed by dividing it into two parts. Each part is fixed respectively to the connecting protrusions 10 of the end wall members 4, 5 at the ends opposite to the divided ends. The parts of the connecting member 6 are connected together by screwing an internal thread 23 and an external thread 24, cut on these facing ends respectively to each other.

Nishimura Citation 5: In Fig. 10 and column 7, lines 33-41

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The spring washer 74 is used to compensate for an axial thermal expansion of the liner 32. By adjusting the clearance between the nut 73 and the bottom wall 43, a moderate movement of the sleeves 38, 39 caused by the stress concentrated on the sleeves 38, 39 and the end wall members 34, 35 in charging CNG under high pressure is permitted while at the same time the upper limit of the amount of this movement is regulated.

Response to 103 Objection

Applicant appreciates the citation of Nishimura by the examiner since Nishimura so distinctly represents the prior art. Examiner is correct in citing Nishimura as specifying a threaded and therefore fixed structural component for the central conduit or tension strut. The threaded connection allows Nishimura to make manual adjustments to the length of the tension pipe or tension element prior to installation and operation of the tank by manually adjusting nut 73. Nishimura has no moment resistance. The problem with this prior art of providing a tension connection is that when the end caps deform outward under pressure the tank end loading is large and requires a substantial central tension member to resist that loading. This further thickens the boss and also requires a substantial tension joint between the tank boss and the central tension member. Bettinger teaches the opposite of this approach. Bettinger teaches that tanks are tensions structures best left to contract and expand as required. Bettinger then goes further to teach that a central conduit can function to prevent skewed deformation and failure of a tank due to external forces on the pressure vessel such as may occur in a ground, air, or space vehicle as the vehicle transmits its flexing motion to a tank during travel.

Therefore Bettinger is upheld over Nishimura in view of Marsh.

Respectfully submitted,



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